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Ungrammatical utterances and disfluent speech as causes of comprehension problems in interaction of preadolescents with highly functioning autism

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Abstract

This study describes the role of ungrammatical utterances and disfluent speech in the creation of comprehension problems between the participants in group therapy sessions of preadolescents with autism. The speech of the autistic preadolescents included frequent disfluencies and morpho-syntactic problems, such as wrong case endings, ambiguous pronominal references, grammatically incoherent syntactic structures and inaccurate tenses, which caused problems of comprehension. Three different interactional trajectories occurred when solving the potential problems of comprehension following the morpho-syntactically disfluent turns. First, the disfluent turn sometimes led to a clarification request by a co-participant, either a therapist or another participant with ASD. The preadolescents with ASD showed interactional skilfulness in requesting clarification when faced with comprehension problems. Second, in contrast, other occurrences included one or several self-repairs by the speaker with ASD. In these cases, the other group participants either did not react or they encouraged the speaker to continue using discourse particles. If the self-repairing disfluencies led to a persisting problem of comprehension, the therapists sometimes intervened and resolved the problem. However, direct interventions by the therapists were infrequent because the participants with ASD were mostly able to resolve the comprehension problems by themselves. Third, some disfluent and/or grammatically incorrect turns were not treated as problematic by the co-participants nor by the speaker himself.

Key words: autism, conversation analysis, disfluent speech, morpho-syntactic problems, comprehension problems

INTRODUCTION

Autism spectrum disorder (ASD) is characterized by deficits in social communication and social interaction as well as by restricted repetitive behaviours, interests and activities (APA, 2013). This study examines group interaction of preadolescents with mild highly functioning autism (previously Asperger syndrome, AS)¹. More precisely, the study focuses on turns that include ungrammatical² utterances and/or disfluent speech and the role of these turns in the creation of comprehension problems³ between the participants. The study further aims at discovering the ways in which ungrammatical and disfluent turns are treated by the participants of the conversation. That is, how do the other participants and the speaker himself try to resolve the comprehension problem that occurs? In practice, we aim at describing different interactional trajectories (that is, the organization of sequences of speaking turns) following the ungrammatical and/or disfluent turns produced by the preadolescents with ASD.

¹ Asperger syndrome (AS) is a diagnostic classification that falls within the autism spectrum. It was a former specific diagnostic category within the autism spectrum (APA, 2000), which was later merged within the larger diagnostic category of autism (APA, 2013).

² By ‘ungrammatical utterances’ we refer to utterances that include morpho-syntactic problems (such as wrong case endings, cut-off syntactic structures, tense problems, etc.) or/and erroneous lexical choices.

³ In this study, ‘comprehension problems’ are materialised by other-initiated repairs. An ‘other-initiated repair’ is a repair that results from a process that was begun by the addressee of the problematic utterance (*SIL Glossary of Linguistic Terms*, 2018; Schegloff, Jefferson & Sacks, 1977).

The data come from two group therapy sessions in which seven 11- to 13-year-old Finnish-speaking boys afflicted with ASD interact with each other and their two therapists. On the one hand, the study focuses on the ways in which the participants handle comprehension problems. On the other hand, we also take into account instances where the turn that includes ungrammatical and/or disfluent speech does not lead to a comprehension problem. In other words, morphosyntactic disfluency may or may not lead to repair or a further request for clarifications. ‘Repair’ in the sense of conversation analysis (CA), was first defined by Schegloff et al. (1977) as ‘the set of practices whereby a participant interrupts the ongoing course of action to attend to possible trouble in speaking, hearing or understanding the talk’ (Kitzinger, 2014, p. 229). ‘Trouble’ refers to such things as ‘misarticulations, malapropisms, use of a “wrong” word, unavailability of a word when needed, failure to hear or to be heard, trouble on the part of the recipient in understanding, incorrect understandings by recipients’ (Schegloff, 1987, p. 210). Repair ensures ‘that the interaction does not freeze in its place when trouble arises, that intersubjectivity is maintained or restored, and that the turn and sequence and activity can progress to possible completion’ (Schegloff, 2007, p. xiv). Repairs can be initiated by the speakers themselves (i.e., the speaker’s self-repair) or by the recipients of talk (i.e. the recipients other-initiate repair by requesting for clarification from the speaker or offer their candidate understanding of the speaker to be confirmed) (Schegloff et al., 1977; Schegloff, 2007). In ordinary conversation, repair operations are short side events after which the interlocutors return to the on-going topic of talk. Quick self-repair within the speaker’s own turn is preferred, and if the recipients other-initiate repair they leave it to the speakers themselves to do the actual repair.

As already mentioned, in this study, ‘comprehension problems’ are materialised by other-initiated repairs in which the repair process is started by the recipient of the problematic utterance (*SIL Glossary of Linguistic Terms*, 2018; Schegloff, Jefferson & Sacks, 1977). When studying comprehension problems from the point of view of CA, it is the subsequent action that shows what the trouble is or whether something in the previous speaker’s turn is oriented to as troublesome,

problematic, repairable, ungrammatical and thus correctable (Schegloff, Jefferson & Sacks, 1977). Thus, we will examine whether the ungrammatical and disfluent turns of speakers with ASD are treated as problematic.

Disfluencies and morphosyntactic problems by speakers with ASD

Many speakers with ASD produce notably disfluent speech. According to Shriberg et al. (2001), 67% of individuals with AS and 40% of individuals with high-functioning autism have inappropriate or non-fluent phrasing, including sound, syllable, or word repetitions and single-word revisions on more than 20% of their utterances. Other studies examining small sample sizes have provided more detailed disfluency analyses in children and adults with ASD (Plexico et al., 2010; Sisskin, 2006; Tetnowski, et al. 2012; Scott et al., 2006; Scaler Scott et al., 2014). These studies have revealed stuttering-like, non-stuttering-like and atypical disfluencies.

Plexico et al. (2010) studied the speech of eight preschoolers on the autism spectrum. In addition to stuttering and non-stuttering-like disfluencies, seven out of eight children had atypical disfluencies, defined by the authors as *between syllable insertions*, *within word breaks*, *final sound and syllable repetitions*, and *final sound prolongations* (p. 48). Scott et al. (2006), in turn, studied the speech of two young adults with AS, and found stuttering-like disfluencies (part-word repetitions and blocks), as well as non-stuttering-like disfluencies (phrase repetitions and interjections). The study also showed that both informants were at least to some extent aware of their disfluencies.

In Sisskin's (2006) study, two persons with AS (aged 7 and 17 years) both exhibited stuttering-like disfluencies (part and whole-word repetitions and blocks) and non-stuttering-like disfluencies (phrase repetitions, revisions and interjections). According to the author (Sisskin, 2006, p. 13), the majority of the disfluencies were either mid-syllable insertions (defined as a short exhalation resembling the production of /h/) or word-final disfluencies (repetitions in which the repetition forms a rhyme by omitting the initial consonant(s) or syllable of the target word, e.g. 'train-ain').

Scaler Scott et al. (2014) compared disfluency patterns in 11 school-aged children with AS, 11 matched children who stutter, and 11 matched children with no diagnosis. The study was based on speech samples collected during an expository discourse task. The results revealed statistically significant differences between children with AS and children who stutter and those with no diagnosis for the percentage of words containing stuttering-like disfluencies. It is noteworthy that in the AS group, four out of 11 (36%) met the common diagnostic criteria for a fluency disorder. The authors also report that disfluencies in the AS group differed qualitatively and quantitatively from the children who stutter. In addition, the AS participants' speech included a larger distribution of word-final disfluencies.

Lake et al. (2011) compared the frequencies of filled pauses, silent pauses, repetitions and revisions in the speech of autistic persons and a control group. The data included 13 adults on the autism spectrum (four of this group were diagnosed with AS) and 13 controls. All participants had an average IQ. The authors found an increased number of silent pauses and disfluent repetitions in the autism group as compared with the controls. Concerning the number of filled pauses and revisions, there were fewer filled pauses and revisions in the autistic persons' speech than in the control group's.

In sum, the above-mentioned studies – although the definitions of disfluencies differed – showed that participants with high-functioning ASD produced atypical disfluencies, such as within word insertions and breaks and word final disfluencies. A conversation analytic study of an adolescent girl with ASD has shown that repetitions that cause disfluency in speech are used as an interactional resource. It demonstrates that one has heard and is orienting to a prior turn to answer, although having difficulties forming the answer (Stribling et al., 2007). The authors conclude that repetitions may in fact be an adaptation to interacting with a limited lexicon.

Syntactic impairments have also been found in individuals with ASD (Cummings, 2014a). McGregor et al. (2012) report that only those children with ASD who do not have syntactic deficits demonstrate age-appropriate word knowledge. ASD children's word learning, in turn, has been found

to be compromised due to their reduced sensitivity to the social information of gaze cues (Norbury et al., 2010). Abnormal concept formation and lexical errors with the use of temporal and spatial expressions have also been observed in connection with ASD (Perkins et al., 2006). Adolescents with high functioning autism have difficulties in the grammatical comprehension of instructions (Saalasti et al., 2008) and a tendency to map verbs onto causative actions (Naigles et al., 2011). Children with ASD may also align their use of syntactic structure to that of a conversational partner (Allen et al., 2011). Thus, children with ASD may have more profound conceptual-linguistic difficulties underlying their challenges in discourse and social interaction.

Pragmatic use and comprehension of language of participants with ASD in conversation

As this study falls within the framework of conversation analysis – closely related to the pragmatic use of language and discourse practices – we present below a brief overview of studies focussed on these aspects in the interaction of persons with ASD.

According to Leekam (2008, p. 105), ‘the majority of children with ASD have language delays and comprehension difficulties that go far beyond difficulties of language expression’. Even the highest functioning children with ASD ‘may show turn-taking rules and conversation skills to some degree, but are still one-sided in their communication, failing to consider their partner’s needs as a listener’ (Leekam, 2008, p. 106). ASD children’s difficulties with the comprehension of language ‘relate to pragmatics and discourse and also go beyond these problems, affecting the structural aspects of language. Structural language impairments in both the use and comprehension of language may be found across the autistic spectrum’ (Leekam, 2008, p. 110).

According to several studies, children with ASD have difficulties in the pragmatic use of language, perspective-taking and shared understanding (Baron-Cohen, 1996; Baron-Cohen et al., 1999; Eales, 1993; Happé, 1994; Kleinman et al., 2001; Tager-Flusberg, 1993, 2001). Indeed, the pragmatic use of language by individuals with ASD is an area that has attracted considerable clinical

and research interest (Cummings, 2009, 2014a, 2014b). People with ASD ‘fail to use language in either an appropriate or effective way in a range of communicative situations’ (Cummings, 2009, p. 56). For example, they have difficulties in the production and comprehension of speech acts, in the use and understanding of non-literal language, in the ability to draw upon contextual information during language interpretation, and in different conversational skills (such as turn-taking) (Cummings, 2009, p. 56, 2014b, p. 49).

In the expressive use of language, Asberg (2010) found that school-aged children with ASD have significantly lower abilities in narrative discourse comprehension than younger, typically developing children. They also have difficulties in narrative co-telling (Solomon 2004), and tend to respond in a noncontingent (i.e. off-topic) manner in conversation (Hale & Tager-Flusberg, 2005a). However, when Hale and Tager-Flusberg (2005b) studied the use of topic-related contingent utterances in the speech of children with ASD, they found that over a period of one year these children made significant progress in the ability to maintain a topic of discourse. Losh and Capps (2003) report that children with ASD have impairments in inferring and building causal relationships within and across story episodes in narrative contexts. Capps et al. (1998) have shown that autistic children less often offer new, relevant contributions in conversations than do developmentally delayed controls. The ASD children also produced fewer narratives of personal experience, and they failed more often than the controls to respond to questions and comments. Thus, children with ASD have frequent problems in language use in social interaction.

In language comprehension, the use of the linguistic context for the interpretation of a verbal message is difficult for children with ASD (Loukusa et al. 2007). The tendencies of people with ASD to understand things literally and to miss implicit messages of interaction are well known (Cummings 2009; Leekam, 2008; Lewis et al., 2008; Martin & McDonald, 2004; Nieminen-von Wendt et al., 2007a, 2007b; Wiklund, 2012, 2016; Wiklund & Stevanovic, forthcoming). According to Cummings (2009, p. 57), this is probably related to the fact that in order to understand an utterance that is used

to implicate something beyond what is stated, a listener must be able to establish the communicative intention of the speaker. This, in turn, requires the ability to make certain inferences about the mental states of others (that is, to have a ‘theory’ of other ‘minds’), which is known to be impaired in autism.⁴ MacKay and Shaw (2004) report that children with ASD perform more poorly than controls with no ASD on a test of understanding and seeing the intentionality behind figurative utterances. According to Lewis et al. (2008), adults with ASD perform significantly less well than neurotypical controls in pragmatic tests examining the comprehension of inferred meaning and the appreciation of humour. Problems of understanding humour by people with ASD are probably also a consequence of their general difficulty in making inferences about the mental states of others (Cummings, 2009; Martin & McDonald, 2004). In the study of Dennis et al. (2001), children with ASD failed to make inferences about what mental state verbs implied in context. They also failed to make inferences about social scripts, and they could not draw the necessary inferences to understand metaphors or to produce speech acts. Thus, the conversations of a person with ASD can be challenged by problems in comprehension (cf. Wiklund, 2012, 2016; Wiklund & Stevanovic, forthcoming).

However, ASD children’s conversational practices are also in many respects similar to those of their neurotypical peers (Ochs & Solomon, 2004, p. 139; Wiklund, 2012). For example, Kremer-Sadlik’s (2001, 2004) findings demonstrate that children with ASD are able to participate relatively competently in question–answer adjacency pair sequences. ASD subjects are also able to correctly interpret the implicit conversational meanings of combinations of dialogue particles, prosodic features and gestures (Wiklund, 2012). It has also been shown that children with ASD are able to launch narratives in conversation (Solomon, 2001, 2004; Wiklund, 2012), and Sterponi’s study (2004) shows that they notice social rule violations. Furthermore, previous studies show that the repair abilities of children with ASD can be functioning quite well. Volden’s (2004) results show that

⁴ Surian’s (1996) study, for example, provides more evidence about the role of ‘theory of mind’ deficits in the pragmatic difficulties of autistic children.

ASD children's repair abilities are in many respects similar to those of non-autistic children. The ASD children were able to respond to requests for clarification and they used a variety of repair strategies. Like the non-autistic controls of the study, the ASD children were able to add more information when a breakdown persisted. However, they were also significantly more likely to respond inappropriately when faced with a request for clarification. Geller (1998) also reported that five elementary- or middle-school-aged children with high-functioning autism attempted to repair most of the communication breakdowns in a free play context. Similarly, Ohtake et al. (2011) found 12 verbal students with autism to repair 80% of communication breakdowns. They used forms of communication that reflected the social meaning of the breakdown but relied also on unconventional forms in their repair attempts.

Prior CA studies have also pointed out that seeing the social-conversational impairment related to autism as a result of an underlying deficit is over-simplified, as participants with autism actively work within the interaction to achieve their goals, and the co-participants mutually affect the flow of interaction (Muskett et al., 2010). Instead, the problematic social behaviours in ASD can be a conversational adaption resulting from an underlying deficit rather than a direct consequence of it (Damico & Nelson, 2005).

DATA AND METHODS

The data consist of audiovisual recordings of neuropsychiatric group therapy sessions in which a group of approximately 12-year-old boys (Group A) and a group of approximately 13-year-old boys (Group B) engage in a discussion with their therapists and each other. Group A consists of three participants and two therapists, and Group B consists of four participants and two therapists. One of the therapists is a man and the other is a woman. The male therapist is the same in both sessions; the female therapist is not. The boys are diagnosed with high-functioning ASD (Asperger syndrome).

Both groups also include one member who had not yet been officially diagnosed with ASD, but had the same symptoms as the other members of the group. The data were collected with the informed consent of the participants and the study was evaluated and approved by the hospital ethics committee (decision number 284/13/03/03/2009).

The duration of each session was two hours. Two cameras were used to film these sessions and each participant also wore a microphone. The sessions started with sharing news: each participant told the group what he had been doing lately, how school was going, and other related matters. After hearing one participant's news, the others asked questions about what they had just heard.⁵ After this, the group discussed a predetermined theme with the help of a series of drawn pictures. In both the sessions filmed for this study, the theme was bullying at school. About one hour after the beginning of the session, the participants and the therapists took a 20-minute break, during which they had a snack in another room. The break was not included in the data. The last part of the session consisted of playing a traditional Finnish board game called 'Star of Africa'. The last part of the session was also not included because participation in game interaction differs from that of group discussion.

Even if disfluencies by speakers with autism have been studied before, the current study is methodologically innovative as it falls within the framework of conversation analysis (CA). Overall, CA is the study of recorded, naturally occurring talk-in-interaction. The aim of studying these interactions 'is to discover how participants understand and respond to one another in their turns at talk, with a central focus on how sequences of actions are generated' (Hutchby & Wooffitt, 2008, p. 12). CA is, however, not just about how people understand and respond to each other, but how participants in social activities – conducted through interaction – build their actions and social activity

⁵ One of the characteristics of ASD is a lack of eagerness to share interests, joys and achievements with others or to show interest in other people's preoccupations (APA, 2013). Reciprocal social interaction in general is difficult for people with ASD. For these reasons, sharing news and asking questions are practised in therapy groups.

together through observable and reportable practices. Studying atypical and asymmetric interactions (such as the group therapy conversations in our data), in contrast with research that taps into impairments by testing the individuals, CA research has the potential to reveal the collaboration and resources of the participants in the interaction. Therefore, a study using the methods of CA may lead to an improved comprehension of the causes and interactional consequences of the impairment phenomena that are being studied (cf. Damico & Nelson, 2005).

The entire data were transcribed in detail following Jeffersonian CA transcription conventions adapted to the Finnish language (Seppänen, 1997). The transcriptions aim at capturing not only *what* is being said, but also *how* something is being said (Hepburn & Bolden, 2013, p. 57). The durations of pauses are indicated in brackets in tenths of a second (for example: (0.5) corresponds to 0.5 sec), interrupted words are indicated with a hyphen (for example: *koir-*), and lengthened sounds are indicated with a colon (for example: *koiraa:*). A complete list of signs and abbreviations used in the transcription of the examples is given at the end of the article. The names of the participants were changed in the transcripts to anonymise them. In the analysis, occurrences of ungrammatical utterances and disfluent speech were collected and examined for their interactional effects, that is, to what kind of interactional trajectories they led. The trajectories were analysed sequentially using CA, including those that led to comprehension problems indicated by other-initiated repairs as well as those where ungrammatical utterances did not affect the flow of interaction by causing problems of comprehension. If comprehension problems emerged as other-initiated repairs, we examined if and how they were solved. The data base forming a collection of sequences initiated by disfluent and ungrammatical utterances were thus inspected to see what kind of systematicity could be found in the interactional trajectories that followed.

As already mentioned, in this study comprehension problems were materialised by other-initiated repairs. The data included 62 other-initiated repairs. All the occurrences are ‘repair initiations’ whereby a repair procedure is started by a listener of talk, but the outcome of the repair is

left for the speaker who produced the trouble-source turn. Most of the repair sequences occurred between the therapists and the boys, but sometimes also between the boys or in rare cases even between the two therapists. A large majority (50 / 80.6%) of all repair initiations were produced by one of the therapists. The fact that most of the repair initiations are produced by one of the therapists might be related to their educational role, that is, to the fact that the therapists are probably engaged in encouraging the participants to articulate things more clearly (Wiklund, 2016). Concerning the types of repair initiations, the data include both ‘clarification requests’ (56 / 90.3%) and ‘candidate understandings’ (6 / 9.7%). In other words, the data include both repair initiations in which the speaker only indicates that there is a need for repair (clarification requests), and instances in which the speaker offers a possible solution to understanding the prior turn (candidate understandings) (Schegloff et al., 1977; Sorjonen, 1997).

MORPHO-SYNTACTIC DISFLUENCY AND COMPREHENSION PROBLEMS IN INTERACTIONS OF MILDLY AUTISTIC PREADOLESCENTS

In this section, we analyse how disfluency and grammatical difficulties contribute to comprehension problems and how these problems are solved interactionally. We will start by presenting an extract where morpho-syntactic disfluency⁶ in speech production leads to a *therapist’s clarification request* (3.1.). In the second example (3.2.), morpho-syntactic disfluency in speech production leads to a *clarification request by another group member with ASD*. In the third example (3.3), morpho-syntactic disfluency in speech production leads to a *self-repair* and to a *therapist’s intervention*. In the last example (3.4.), a *turn is understood in context* despite the morpho-syntactic disfluency in speech production that it includes.

⁶ By ‘morpho-syntactic disfluency’ we refer to utterances where the disfluency is created by morpho-syntactic problems, such as wrong case endings, cut-off syntactic structures and tense problems.

Morpho-syntactic disfluency leads to therapist's clarification request

The most common sequential trajectory in the data base was therapist other-initiated repair after a disfluent and morpho-syntactically complex turn was produced by a boy with ASD. Example 1, which comes from the Group B session, highlights this trajectory. One of the boys, Toni, has just shared his latest news. He mentioned that it has been boring at school, and the female therapist reacts to this by saying that when she and the other therapist were kids they thought that going to school was fun. This leads to a discussion about the quality of food offered at school at that time. Morpho-syntactic disfluency is clearly present in Jaakko's speaking turns in lines 07-11, and in line 13 the male therapist requests clarification. 'FT' in the transcriptions refers to the female therapist and 'MT' refers to the male therapist.

Example 1.

01 Kalle: [no] (.) silloin oli varmaan kou#luruokakin parem°paa°#;
well at that time food at school was probably also better

02 Toni: nii;
yeah

03 Jaakko: ((looks at Toni)) njää,
n-yeah

04 FT: ((bends towards Toni)) =mikä mikä oli,?
what what was

05 Toni: <kouluruoka>
food at school

06 FT: (smack) [njaa-a] ((turns to look at Jaakko))
um I see

07 Jaakko: [#ää no] silloin# silloin perusruoka #sil
well er at that time at that time basic food(-NOM) at that
well er at that time at that time basic food at that

- 08 tasolla oli alhasempi ku nykyään joten# (0.4) krh (0.4)
 level was lower than nowadays so krh
level was lower than nowadays so
- 09 ↑kouluruoka ei tartte #°olla ni°# .hh (0.4) niin hy- (0.3) °hy-°
 the food at school(-NOM) no need to be that that go- go-
the food at school doesn't need to be that that go- go-
- 10 oliv- (.) #ei tarttenu olla ↑niin hyvää >koska se on samaa
 wa- no needed be so good because it is same(-PAR)
 wa- didn't need to be so good because it is on the same
- 11 luokkaa kuin ↑ne< (2.0) >jos joku just tajus mitä mä sanoin<.
 level-PAR as them if someone just understood what I said
level as them if anyone just understood what I said
- 12 (2.4)
- 13 MT: ((looks upwards)) samaa luokkaa kuin; ((turns to look at Jaakko)
on the same level as
- 14 Jaakko: .mth #no kun al- (.) (>kun oltii a↑jas<) taakseppäin#
well when lo- back in the old days
- 15 ruoka oli vähän <↑alhaisempaa>. (0.9)
food was a bit lower
- 16 #silleen (0.5) mh silleen kuing (.) °hy- pa-° (0.3) <makusta> ?
I mean like like how go- ba- taste
- 17 (0.3) ja >↑kouluruoka on< parempaa joten ne on samal ↑linjalla
and the food at school is better so they are on the same level

18 (0.5) johtuen †ajastansa. (1.4)
due to their time

19 FT: ((looks at Jaakko and nods)) hmm-m?
uh um

20 Jaakko: <eli sil periaatteella (0.8) silloin †oli °parempaa°. >
so on that principle at that time it was better

21 (2.0)

22 MT: mm
um

23 FT: ((looks at Jaakko)) (smack) jaaha
um I see

In this extract, Jaakko has difficulties verbalizing what he wants to say as he keeps on repeating his words and reformulating his utterance. The trouble-source turn includes several morpho-syntactic problems, such as wrong case endings, ambiguous pronominal references and cut-off syntactic structures (lines 7-11). For example, he uses the nominative case instead of the genitive case (line 07: *perusruoka* → *perusruoan*; line 09: *kouluruoka* → *kouluruoan*). The first utterance (lines 7-8) also contains the ambiguous pronominal reference *sil* ('that', line 07). It is not clear what this pronoun refers to, but it is possible that the speaker is using the adessive form of the demonstrative pronoun *se* 'it' (*sillä* shortened *sil*) to replace the genitive case ending of the word *perusruoka* ('basic food', line 07). The structure of the second utterance, starting with the word *kouluruoka* ('food at school', line 09), is remarkably disfluent. It includes false starts (*hy-*, *hy-* and *oliv-*, lines 09-10) and pauses. At the beginning, there is also a tense problem: the speaker uses the present tense (*ei tartte olla*, 'doesn't need to be', line 09) instead of the past tense. This is, however, corrected by the speaker soon after (*ei tarttenu olla*, 'didn't need to be', line 10), which makes the utterance more comprehensible.

Naturally, the occurrences of the wrong cases and cut-off syntactic structures are interrelated. That is, when the case ending is not correct, the overall syntactic structure of the utterance does not work. These morpho-syntactic problems seem to be caused by problems in the planning of speech. When analysing speech element by element, it can be seen that the speaker is changing the utterance all the time. Consequently, the choice of words, case endings used and the overall grammatical form of the utterance do not match and speech becomes disfluent and difficult to understand. This leads to a noticeable silence (2.4 secs, line 12) and then to the therapist's request for clarification (line 13).

The main cause of the comprehension problem is the ambiguous pronominal reference *ne* ('them', line 11) at the end of Jaakko's second utterance. The clarification request made by the male therapist (line 13) clearly targets this element as troublesome: the therapist repeats the expression *samaa luokkaa kuin* ('on the same level as') used by Jaakko just before the 'problem element' of the turn, the demonstrative pronoun *ne* ('them', line 11).

It is noteworthy that Jaakko is here able to respond to the therapist's request for clarification. This is in line with previous research results that show that adolescents with high-functioning autism attempt to repair when confronted with a clarification request (Geller, 1998; Ohtake et al., 2011; Volden, 2014). In lines 14-18, Jaakko gives a long clarification of his previous turn. However, this turn is also remarkably disfluent. All the utterances of the turn are grammatically incoherent. The turn also includes false starts (*al-*, line 14; *hy-* and *pa-*, line 16) and a tense problem (line 20): the speaker again uses the present tense (*ja kouluruoka on parempaa joten ne on samal linjalla*, 'and the food at school is better so they are on the same level'), instead of the past tense. In this turn, Jaakko also seems to have more obvious difficulties in finding words (line 18): the food cannot be 'lower' (although its level can) (cf. Norbury et al., 2010). This is also in line with previous observations that adolescents with ASD may use unconventional forms in repairing their utterances (cf. Ohtake et al., 2011).

Despite these problems, the female therapist nods and produces the discourse particle ‘hmm-m’ with a rising pitch (line 19). Jaakko interprets the interactional meaning of the discourse particle as a continuer and continues, adding more information to clarify his point. This interactional strategy is successful, as both therapists produce discourse particles, indicating – at least superficially⁷ – that they have understood what Jaakko has tried to say (lines 22-23). Thus, even if the boy’s speech includes many morpho-syntactic problems, he resolves the comprehension problem with his own action. It is also noteworthy that Jaakko is himself orientated to the potential comprehension difficulty of his recipients. Indeed, at the end of his turn (line 11), after a 2-second pause with no responses from his recipients, Jaakko says *jos joku just tajus mitä mä sanoin* (‘if anyone just understood what I said’) thus displaying his awareness of his problems of expression.

Morpho-syntactic disfluency leads to clarification request by another group member with ASD

Adolescents with high-functioning ASD were also able to request clarification themselves if they didn’t understand what others said. This further points out their interactional skills and orientation to solve the problems of comprehension. This is displayed in Example 2, in which Group A is discussing bullying at school. The male therapist has asked the boys if they have themselves bullied others at school. Markus answers the question with disfluent turns (lines 01-15) to which another group member, Harri, responds with a clarification request (line 17).

Example 2.

01 Markus: *no, (.) nos sellasia tilant- että*
 well well that kind of situat- that

⁷ As the therapists do not comment at all on the contents of what the boy has just said, it is however not certain that they have completely understood it. Indeed, the discourse particles that the therapists produce here constitute ‘displays of understanding rather than ‘proofs of understanding’ (Sacks, 1992).

well well that kind of situat- that
 02 nev ↑VÄIT↓tää et mä olisim muka
 they pretend that I would ADV
 they pretend that I would have
 03 ↑KIU↓sannu; .hhhh (0.6) ↑jos, (0.6)
 bullied if
 bullied if
 04 ov <vaik↓ka>, (1.4) ei ↑teem mi↓tää
 is for example no do anything
 there is for example one does not do anything
 05 muuta ↓kuv vaa että, (.) menee
 else but just that goes
 else other than just goes
 06 ↑sano↓maa ↑opet↓tajallet tai, .hhh
 say to the teacher or
 to tell the teacher or
 07 (1.0) hhh (0.4) tai s'te ne ↑sanoo ↓et
 or then hey say that
 or then they just say that
 08 ↑TUO ↓alott' tuo alotti ja sitte
 he start- he started and then
 he start' he started and then
 09 an, (.) taa ↑kaikkien ↓syyt
 give everybody's blame
 try to put the blame
 10 ↑niskoi↓llee aina kaikille, (.)
 on always to everybody
 always on all
 11 ↑fiksuil↓le antaa syyt niskoille?
 to smart ones put the blames on
 smart ones try to put the blame

12 MT: mm,
mm

13 Markus: °(xxx)° (.) saa kaikki fiksut ja, (.)
xxx get all the smart ones and

14 ne ↑ite, (.) sitten on ↑opet↓tajal
they themselves are then teacher's

15 ↑lellik↓kejä °ne°, hh
favourites them

16 (0.6)

17 Harri: >ai siis< että?
you mean that?

18 Markus: ↑kiu↓saajat.
the bullies

The disfluency is created here by false starts and incoherent syntactic structures, as well as by recurring changes in pitch and intensity and by frequent pauses inside the turn. Again, Markus is also repeating and reformulating his utterances to make them more understandable (lines 1-11). The therapist reacts to Markus's long turn with a minimal response ('mm'), indicating that he is listening (line 12) (ISK, 2004: § 798). After that, Markus continues speaking, which shows that he has interpreted correctly the interactional meaning of the *mm* produced by the therapist. Markus's second turn (starting on line 13) is, however, also disfluent due to problems similar to his previous turn.

Harri reacts to Markus's turn with an open clarification request (*ai siis että*, roughly translated 'you mean that') (line 17). Markus answers immediately 'the bullies' (line 18). Thus, Markus interprets the pronoun *ne* ('they') as the cause of the comprehension problem. Indeed, Markus repeats the personal pronoun *ne* several times in his two first turns, but he does not mention the referent of the pronoun before Harri asks for it. Markus's action shows that he has interactional skills: he reacts to a clarification request immediately and in an adequate manner showing that he realizes that a

personal pronoun without its referent can cause comprehension problems. Indeed, the trouble gets solved and Harri's next turn is clearly related to what Markus has just said. In these kinds of instances, the participants with ASD solve the comprehension problems entirely by themselves.

Morpho-syntactic disfluency in speech production leads to self-repair and to therapist intervention

In some more complex sequential trajectories the boys were not able to resolve the comprehension problems by themselves despite their efforts to self-repair and ask for clarification. In these cases, the therapist intervened more directly to restore the interactional understanding (Example 3). Example 3 comes from the Group A session, in which the boys and the therapists are engaged in small talk before the actual beginning of the session. Just before this extract, one of the boys, Harri, has said that he always takes the bus to school when the weather is not good. Another boy, Markus, reacts to this turn by stating that he also takes the bus (line 01). Harri's morpho-syntactic disfluencies are displayed when he asks Markus for more information (lines 8-9 and 12). The therapist's interventions to solve the comprehension problems are seen in lines 15, 21-23, and 28-30.

Example 3.

01 Markus: [m]ä_k]im meed °dösällä°,

I also take the bus

02 MT: mm m?

mm m

03 (.)

04 Harri: ai sillon ku o huono ilma?

you mean when the weather is bad

05 Markus: kr[h_{hh}]

krhhh

06 Harri: [>mee]ksä muutenki<,

or do you always take the bus

07 (0.8)

08 Harri: >aiku ai niij joo ku sä< asutte- sev=verran

PRT oh PRT yes because you (2. per. sg.) live (2. per. pl.) that much

oh yes I see it's because you live- so

09 kaukana siitä sun himastas.

far from that your home

far from your home

10 (0.4)

11 Markus: joo,

yeah

12 Harri: ai s'se koulu on siitä: kaukana him[°]assa[°].

oh th' that school is from that far at home

oh the school is so far at home

13 Markus: nii::.

ye::s

14 (0.6)

15 MT: m- kuulitsä mitä Harri ky#[°]syi[°]#.

did you hear what Harri asked

16 Markus: <kylläk kou>lu >sanotaa j jos se on<

yes the school let's say if it is

17 kilometri tai kaks,

one kilometre or two

18 (0.6)

19 MT: mm m?

20 Harri: no kyl s' sit #aika kaukana on#?

well it is quite far then

[42 transcription lines removed]⁸

21 MT: niin. (.) m- >mutta< kuulitsä

yes b- but did you hear

22 tota:, .hh hh a- Markus mitä:,

(PRT) Markus what

23 mitä Harri sulta kysy tossa,

what Harri just asked you

24 (.)

25 Markus: että onk se bussi ka-a-

that is it the bus fa-a

that is the bus

26 kaukana °se matka°,

far the way

far the way

27 (0.4)

28 MT : .hh niin tai hän kysy=että

yes or he asked you if

29 meeksä joka (b-) (0.4) päivä

you take the bus every day

⁸ We have removed 42 lines of transcription here from a passage where the person who is responsible for the sound recording intervenes due to a technical problem. After that the conversation continues.

30 *pussilla ko°uluu°,*
 for school

31 Markus: *no ei=nyt ihaj joka pä#ivä;*
 well not quite every day

Harri first asks Markus if he always takes the bus to school or only when the weather is not good (lines 04 and 06). As Markus does not immediately answer, Harri continues with a disfluent turn in which he displays a change-of state with particles *ai* ‘oh’ as if it suddenly occurs to Harri that Markus lives so far from school that he has to take the bus and he offers this interpretation as a candidate for Markus to confirm. The word ‘school’ (*koulu*) is, however, missing from the turn. Instead, the turn includes the expression ‘from your home’ (*himastas*) (line 09), which makes the turn incoherent (‘you live so far from your home’). Nevertheless, Markus seems to understand Harri’s question, because he answers ‘yeah’ (*joo*) (line 11). After that, Harri self-repairs and reformulates his prior turn by including both the words ‘school’ (*koulu*) and ‘home’ (*hima*) in it (line 12). The word *hima* (‘home’) has, however, the wrong case ending: he says *himassa*, meaning ‘at home’, when a grammatically suited word is *himasta*, meaning ‘from home’. Similarly to Jaakko in Example 1, Harri has difficulties producing grammatically suitable case endings to form a morpho-syntactically fluent utterance. However, Markus answers with the discourse particle *nii:* (‘yes’) (line 13), which is lengthened and indicates here that he agrees with the previous speaker (ISK, 2004: § 798).

Because Markus has still not answered Harri’s original question in lines 4 and 6, the male therapist intervenes and directs Markus to answer (line 15). However, Markus does not directly answer the original question (lines 4-6) but reacts to the later one they have more recently been discussing (lines 08-09) by referring to the distance between home and school (lines 16-17). Nevertheless, Harri seems to understand and manages to formulate a coherent and a fluent turn: *no kyl s’ sit aika kaukana on* (‘well it is quite far then’) (line 20).

The fact that Harri asks Markus a spontaneous question (line 04) shows that Harri has interactional skills. It is also noteworthy that Harri complements his question spontaneously with a candidate understanding when he does not get an answer immediately (lines 08-09). Markus, in turn, uses discourse particles consistently in his answers (lines 11 and 13). Nevertheless, the boys seem not to understand each other completely in this extract. Harri has difficulties putting his thoughts into words, and Markus is not really answering all the questions he has been asked.

After the interruption caused by a technical problem, the male therapist indirectly tries to encourage Markus to answer Harri's original question by asking (lines 21-23) whether he had heard what Harri asked. However, Markus does not answer but continues to refer to the distance between his home and the school with a morpho-syntactically disfluent turn (lines 25-26). As a consequence, the male therapist offers his interpretation of Harri's original question (lines 28-30), which finally resolves the problem, and Markus manages to formulate a fluent and a coherent turn as an answer (line 31). In this sequence, the participants with ASD are not managing the trouble in comprehension by themselves but problem solving is supported by the therapist.

Morpho-syntactic disfluency in speech production is understood in context

As mentioned earlier, morpho-syntactic disfluency did not always lead to problems in comprehension. Example 4, involving Jaakko and the male therapist, presents an instance where a grammatically incoherent turn does not cause any comprehension problems. The extract comes from the Group B session. In this passage, Jaakko has just shared his latest news, and the other boys have asked him questions. When the therapists ask if the boys still have more questions (lines 01-03), Jaakko takes the floor with a morpho-syntactically disfluent turn (lines 05-06). It is noteworthy that Jaakko shows interactional skills in reacting to a long silence by taking the floor and trying to keep up the conversation on a current topic.

Example 4.

01 MT: muita kysymyksiä?

other questions

02 (3.0)

03 FT: tuleeko jotakin mieleen.

does something come to mind

04 (4.0)

05 Jaakko: mä voisin ainaki olla ↑ittelleni yks hyvä

I could at least be to myself one good

I could at least be one good question to myself

06 kysymys ?

question

07 MT: En mikä.En

well what is it

08 Jaakko: mitä siin leffas tapahtu.

what happened in the movie

09 MT: mm;

mm

10 Jaakko: >paitsi jos joku< on menos tietenki kattoos

except if someone is going to see

11 sen niin.

it so

12 MT: krhm

krhm

13 Jaakko: siis kukaan ei oo menos sitä kattoon niin

so if no one is going to see it so

14 voin alkaa selittää. (.) tai jos joku haluu

I can start explaining or if someone wants

15 kuulla mun selittävän siitä.

to hear me telling about it

Jaakko's turn in lines 5-6 is syntactically incoherent: he says *mä voisin ainakin olla ittelleni yks hyvä kysymys* 'I could at least be to myself one good question', when he probably means: *mulla voisi ainakin olla ittelleni yks hyvä kysymys* 'I might have at least one good question to myself'. However, it is easy to deduce its meaning from the context. The problem turn is also much shorter and more fluently produced than the complex turns in the previous examples. The male therapist understands immediately what the boy wants to say and he reacts to Jaakko's turn by saying *no mikä*, which means 'well what is it' (line 07). After that, Jaakko presents a fluent turn (line 08). Thus, with a competent co-participant who can use contextual support in interpreting his turn, Jaakko's grammatically incoherent turn does not cause comprehension problems.

CONCLUSION

The findings of this study suggest that the speech of preadolescents with mild highly functioning ASD includes morpho-syntactically disfluent segments that often, but not always, cause problems in comprehension between the participants. In particular, the speech of the informants of this study was characterized by problems such as wrong case endings, ambiguous pronominal references, cut-off syntactic structures, tense problems and unconventional lexical choices. The disfluencies occurring in the data were also often related to such prosodic features as abrupt changes of pitch, intensity and speech rate, as well as to recurring pauses inside a turn. False starts were also rather typical. These morpho-syntactic disfluencies suggest that children with ASD may have profound linguistic difficulties, e.g. on the lexical-conceptual level (cf. Perkins et al., 2006), that they try to resolve and self-repair while speaking.

Despite the problems in forming their utterances, the informants of this data also showed that they do have certain interactional skills. For example, they were able to present spontaneous

questions, request for clarification, self-repair, react to clarification requests and therapist interventions, use and understand the interactional meanings of discourse particles, and formulate coherent utterances that did not include any grammatical errors.

In conclusion, three different interactional trajectories were found to solve the potential problems of comprehension following the morpho-syntactically disfluent turns. First, a turn that included morpho-syntactically disfluent speech sometimes led to a clarification request by a co-participant, either a therapist (see Example 1) or another participant with ASD (see Example 2). The therapists typically reacted to the problem turn with a request for clarification. They also often used discourse particles that invited the speaker to continue. Second, some other occurrences, in contrast, included one or several self-repairs by the speaker with ASD. In these cases, the other group participants either did not react or encouraged the speaker to continue with discourse particles. If the comprehension problem persisted, the therapists intervened more directly to resolve the problem. Third, some disfluent and/or grammatically incorrect turns were not treated as problematic by the co-participants or by the speaker himself.

DISCUSSION

This study confirms the findings by Scaler Scott et al. (2014) and Shriberg et al. (2001) that there are many disfluencies in the speech of individuals with high-functioning ASD. However, the disfluencies were mostly not mere repetitions but self-repairing reformulations that seemed to arise from more profound linguistic problems in planning speech and thereby constructing coherent and grammatical utterances. When producing speech, the adolescents with ASD displayed difficulty in finding and choosing the right lexical items, both words and case endings. This is in line with the study of Norbury et al. (2010) that found that the learning of meanings is compromised in autism due to a reduced sensitivity in following gaze cues and sharing objects of attention with caregivers. The findings were

also similar to those of Perkins et al. (2006) according to which adolescents with ASD may have unconventional use of lexical concepts and they make errors with temporal and spatial expressions. In our data, it was especially the meanings of inflectional morphemes, i.e. case endings typical of Finnish, as well as the descriptive meanings of words, that were difficult for the participants with ASD and were often used unconventionally.

When the adolescents with ASD produced less accurate words and used wrong case endings they were able to monitor the problems, frequently interrupting their speech in order to self-repair, which is a skill that has not been given much notice in prior studies. This is in line with Scott et al. (2006) who observed that two young adults with ASD were at least to some extent aware of their disfluencies. With their attempts at self-repair the ASD participants in our study showed that they can take into account the recipient's perspective of how understandable their speech is. Frequent revisions by children with ASD have also been found by Sisskin (2006), but other small scale studies of adults have not found revisions and repairs to be common (e.g. Lake et al., 2011). Thus, there is some discrepancy with prior studies. However, according to the current study, revisions seem to be inherent in speech by adolescents with ASD who are still developing their language skills. On the basis of the current study, the nature of disfluencies and the role of self-repairing revision in causing them should be studied in more detail with larger numbers of young and adult participants with ASD in order to better understand the phenomenon.

The adolescents with ASD in our data self-repaired and changed meanings constantly. Due to abandoned utterances, they were often not able to produce words syntactically aligned with the grammatical form of the on-going utterance. This finding suggests that the speech disfluencies and the problems of morpho-syntactic alignment are largely due to continuous attempts at self-repair. Thus, they are more of a conversational adaptation to an underlying deficit than a direct reflection of the deficit, as some prior CA studies have also suggested (e.g., Damico & Nelson, 2005). Our findings are in line with the previous studies that suggest that adolescents with ASD have more profound

conceptual-linguistic difficulties underlying their challenges in discourse and social interaction (Cummings, 2014a; McGregor et al., 2012; Naigles et al., 2011; Perkins et al. 2007; Saalasti et al., 2008). The linguistic problems we found in fluent utterance construction can also be connected to the previous findings of problems in higher-level cognitive processes such as attention, working memory, and executive function, which may underlie the difficulties in linguistic development of individuals with high-functioning autism (e.g. Joseph, McGrath & Tager-Flusberg, 2005; Kenworthy, Yerys, Anthony & Wallace, 2008). However, our conversational findings only suggest this and further studies are needed to explore the connections to underlying impairments.

A novel finding in this study is the *consequence* of the morpho-syntactic disfluencies for comprehension in this kind of group conversation. After ungrammatical and morpho-syntactically disfluent utterances, three interactional trajectories were found. In the first trajectory, the problem of comprehension was solved immediately by the recipient's clarification request and a repair by the speaker with ASD. Similar to the findings of previous studies by Geller (1998), Ohtake et al. 2011 and Volden (2004), adolescents with ASD were able to respond to requests for clarification and repair. In the second trajectory, the problem was solved only by self-repair and, when the problem persisted, the therapist's intervention, i.e. a more comprehensive support, was needed. In the third trajectory, no comprehension problems emerged as the recipients were able to interpret the meaning from the context, despite the morpho-syntactic problems and disfluency of the production. The structure of interaction in the first and third trajectories was similar to ordinary conversation. In these cases, the problems were solved either immediately by other-initiation of repair (cf. e.g. Schegloff, 2007) or the conversation continued without problems. In the second trajectory, problem-solving needed more intervening support from the therapists, and thus the interaction was more like institutional atypical interaction (c.f. e.g. Laakso & Godt, 2016, in which the therapists interpret the grammatically and lexically incoherent utterances of speakers with aphasia).

In our data, frequent interruptions and revisions resulted in abandoning ongoing utterances and restarting new grammatical constructions. This in turn led to lengthy speaking turns that were morpho-syntactically ungrammatical, complex and difficult for the recipients to understand. As a consequence, problems of comprehension frequently occurred. In our data, the participants with ASD were also able to request clarification when faced with comprehension problems. This differs to some extent from previous experimental findings suggesting that individuals with ASD have problems in using context to interpret meanings (Loukusa et al., 2007). This difference may result from the fact that the group conversation data used in this study gives an ecologically more valid context for the study of interactional phenomena. In this kind of data the interactional skills and resources of the participants with ASD also become more observable. Furthermore, in this kind of conversational data it is also possible to see what an individual with ASD is able to do with the collaborative support of a more competent participant, a therapist.

In the future, it would be important to study disfluencies and morpho-syntactic difficulties, as well as their interactional consequences, made by adolescents with high-functioning autism spectrum disorder in a larger data set to verify whether the observations of this study apply more generally. Cross-sectional studies in different interactional circumstances and longitudinal studies of children of different ages and severities of ASD could also increase our awareness and knowledge of the linguistic and interactional problems related to autism spectrum disorders in different contexts and during development over time. Finnish is an agglutinative language in which morphological features are fundamental in the syntactical formation of utterances. It would therefore be interesting to see if the disfluencies are similar in other agglutinative and non-agglutinative languages.

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Statement of Interest

The authors declare no conflict of interest.

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TRANSCRIPTION CONVENTIONS

.	strongly falling pitch at the end of a prosodic unit
;	slightly falling pitch at the end of a prosodic unit
,	flat pitch at the end of a prosodic unit
,?	slightly rising pitch at the end of a prosodic unit
?	strongly rising pitch at the end of a prosodic unit
↓	segment produced on a lower pitch level than the surrounding speech
↑	segment produced on a higher pitch level than the surrounding speech
#	creaky voice
s <u>i</u> ka	prominent stress
>tos<	accelerated speech rate
<paitsi>	slowed speech rate
joo:	lengthened vowel
MITÄ	increased level of loudness
.hhh	clearly audible inhalation (one 'h' corresponds to 0.1 sec)
hhh	clearly audible exhalation (one 'h' corresponds to 0.1 sec)
.joo	word produced with an inhalation

@just@	marked voice
k(h)iva	word produced laughingly
ɤniimpäɤ	word produced smilingly
·nii·	word produced more quietly than the surrounding speech
[overlap of speech begins
]	overlap of speech ends
(.)	micropause (duration of less than 0.2 sec)
(0.6)	pause (duration measured in seconds)
(lapset)	unclear speech

ABBREVIATIONS

ADE	Adessive
ALL	Allative
CLI	clitic
GEN	Genitive
INE	Inessive
NOM	Nominative
PER	person
PL	plural
PRT	particle
SG	singular